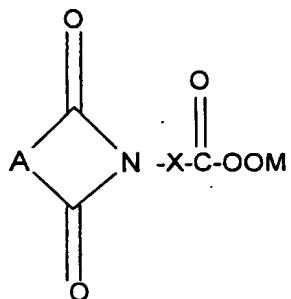


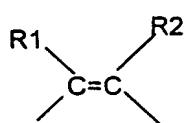
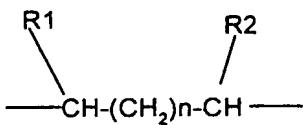
**CLAIMS**

1. Imido-alkanpercarboxylic acids having formula (I):

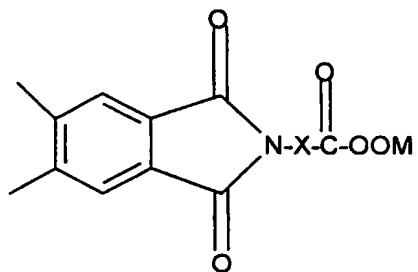
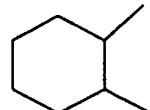
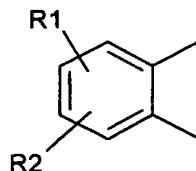


(I)

wherein A indicates a group selected from the following:



or



wherein:

n is an integer 0, 1 or 2,

R1 has one of the following meanings: hydrogen, chlorine, bromine, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>2</sub>-C<sub>20</sub> alkenyl, aryl or alkylaryl,

R<sub>2</sub> is hydrogen, chlorine, bromine or a group selected from the following: -SO<sub>3</sub>M, -CO<sub>2</sub>M, -CO<sub>3</sub>M or -OSO<sub>3</sub>M,

M has the meaning of hydrogen, an ammonium alkaline metal, or an alkaline-earth metal equivalent,

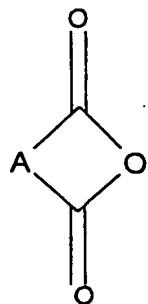
X indicates a C<sub>1</sub>-C<sub>19</sub> alkylene or an arylene;

said imido-alkanpercarboxylic acids being in a crystalline form, herein called alpha, stable at storage at the solid state, but when dispersed in water is transformed into crystals of the known crystalline form of the prior art (herein called beta), stable in aqueous environment, said crystals of beta crystalline form having average sizes lower than 30 micron, preferably lower than 10 micron, more preferably lower than 8 micron, in particular lower than or equal to 2 micron; said alpha crystalline form being characterized with respect to the known beta crystalline form of the prior art due to the fact that the respective spectra obtained by the X Ray Diffraction and Surface Infrared Spectroscopy (IR/S) techniques show, with respect to those of the beta form of the same peracid, a different spectral imagine at X rays and a typical absorption shift in the 1697-1707 cm<sup>-1</sup> zone by IR/S towards higher frequencies, of the order of 10 cm<sup>-1</sup>.

2. Acids according to claim 1, wherein the acid is  $\epsilon$ -phthalimido-peroxyhexanoic acid in alpha crystalline form, characterized by the following chemico-physical parameters:
  - at X rays: peaks at 17.5 and 19.0 and quadruplet at 24.2 - 25.0 [ $^{\circ}2\theta$ ],
  - at IR/S spectrum: peak with maximum absorption in the 1707-1712 cm<sup>-1</sup> zone, for anhydrous crystals, having a water absorption at 3450-3500 cm<sup>-1</sup> lower than 5%.
3. Imido-alkanpercarboxylic acids of beta crystalline form obtainable by dispersing in water crystalline particles

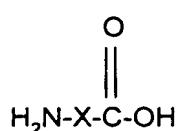
of alpha form according to claims 1-2, said particles of beta crystalline form having average sizes lower than 30 micron, preferably lower than 10 micron, more preferably lower than 8 micron, in particular lower than or equal to 2 micron.

4. Solid compositions comprising imido-alkanpercarboxylic acids in alpha crystalline form of claims 1-2, preferably in the form of granulates for their use in the detergency and disinfection field.
5. Compositions comprising the imido-alkanpercarboxylic acids of claim 3.
6. Compositions according to claim 5 in aqueous phase.
7. Compositions according to claims 5-6, wherein the content of percarboxylic acids ranges from 0.5% to 25% by weight based on the total of the composition.
8. Compositions according to claims 5-7 comprising suspending agents.
9. Compositions according to claim 8, wherein the amount of suspending agent, expressed in concentration by weight, is from 0.05% to 0.6%.
10. Compositions according to claim 9, wherein the amount of suspending agent is from 0.05% to 0.1%.
11. Compositions according to claims 5-10 comprising surfactants, preferably nonionic or anionic surfactants.
12. Compositions according to claim 11 comprising hydrogen peroxide at concentrations by weight from 0 to 10% based on the total of the composition.
13. Process for the preparation of imido-alkanperoxy-carboxylic acids of claim 1 comprising the following steps:
  - I) peroxidation in the presence of hydrogen peroxide and of a strong acid generally at a temperature comprised between 5°-50°C of an imido-alkan carboxylic acid precursor obtainable by reaction of:
    - a) an anhydride of formula:



or the corresponding acids, A being as above,  
with

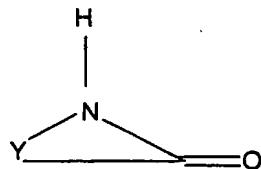
b1) an aminoacid of formula:



X being as above,

or

b2) a lactam of general formula:



Y having the meanings of X, preferably C<sub>3</sub>-C<sub>19</sub>  
alkylene;

c) water;

at temperatures in the range 100°C-250°C, under pressure of an inert gas from 1 to 30 bar, for reaction times from 2 to 20 hours;

- II) obtaining of a melted phase of eutectic composition of the imido-alkanperoxycarboxylic acids of formula (I) by heating a suspension in water of said peracids until the complete melting of the solid, said eutectic having a composition on a molar basis of no more than two moles of water/peracid mole;
- III) separation of the melted organic phase of eutectic composition from the aqueous phase in balance and recovery of the melted organic phase containing the imido-alkanpercarboxylic acid;

- IV) quench of the melted phase and obtaining of the phase herein called alpha, stable at the solid state.
14. Process according to claim 13, wherein in step IV) the quench is carried out by dripping the melted organic phase of eutectic composition in liquid nitrogen.
  15. Process according to claim 13, wherein in step IV) the quench is carried out by dripping in cold water, under stirring, having a temperature lower than 15°C.
  16. Process according to claim 13, wherein in step IV) the quench is carried out by percolation of the melted phase on a metal surface, or on two metal surfaces, coupled and cooled at temperatures lower than 30°C.
  17. Process according to claims 13-16, wherein in step I) the ratio by moles between a/(b1 or b2)/c is in the range 1/0.8:1.2/0.5:3, preferably said ratio by moles a/(b1 or b2)/c being comprised between 1/1.01:1.1/0.5:2.5, more preferably between 1/1.05: 1.1/1-2.
  18. Process according to claims 13-17, wherein in step I) the anhydride a), or the corresponding acid is reacted with the lactam b2).
  19. Process according to claims 13-18, wherein the compounds of the class a1) are selected from the following anhydrides or corresponding acids: succinic, glutaric, maleic, trimellitic, phthalic, pyromellitic and alkyl- or alkenyl-succinic anhydrides, preferably phthalic anhydride or phthalic acid.
  20. Process according to claims 13-19, wherein the class b1) compounds are selected from the following: omega-aminobutyric, omega-aminovalerianic, omega-aminocaproic and omega-aminolauric acid.
  21. Process according to claims 13-20, wherein the compounds of the class b2) are selected from the following: gamma-pyrrolidone, delta-piperidone, epsilon-caprolactam, and omega-laurolactam, epsilon-caprolactam (CPL) is particularly preferred.

22. Process according to claims 13-21, wherein in step I) the temperature is in the range 130°C-180°C and the pressure in the range 4-8 bar.
23. Process according to claims 13-22, wherein the imido-alkanpercarboxylic acids are selected from phthalimido-peracetic acid,  $\epsilon$ -phthalimido peroxyhexanoic acid, 3-phthalimido-perpropionic acid, 4-phthalimido-perbutyric acid, 2-phthalimido-diperglutaric acid, 2-phthalimido-dipersuccinic acid, 3-phthalimido-perbutyric acid, 2-phthalimido-perpropionic acid, 3-phthalimido-diperadipic acid, naphthalimido-peracetic acid, 2-phthalimido-monopersuccinic acid.
24. Process according to claims 13-23, wherein in step II) sequestrants are added in the aqueous phase.
25. Process to obtain the imido-alkanpercarboxylic acids according to claim 3, wherein the peracid particles in the alpha form obtained according to the process of claims 13-24 are suspended in a stirred aqueous phase and maintained at a temperature from 0°C to 75°C, preferably from 20°C to 70°C, more preferaly from 40°C to 60°C for a time ranging from 1 minute to 90 minutes, preferably from 10 minutes to 60 minutes, more peferably from 20 minutes to 45 minutes.
26. Use of the imido-alkanpercarboxylic acids of claims 1-2 to obtain the corresponding acids in beta form of claim 3.
27. Use of the imido-alkanpercarboxylic acids of claims 1-2 and of claim 4 in the bleach or in disinfection applications.
28. Use of the imido-alkanpercarboxylic acids of claim 3 and of claims 4-12 in bleach or in disinfection applications.